



Sequence Listing created in PatentIn.ST
SEQUENCE LISTING



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<110> Weigel, Paul H
Kumari, Kshama
DeAngelis, Paul

<120> STREPTOCOCCUS EQUISIMILIS HYALURONAN SYNTHASE GENE AND EXPRESSION THEREOF IN
BACILLUS SUBTILIS

<130> 3554.049

<140> US 09/879,959

<141> 2001-06-13

<150> 09/469,200

<151> 1999-12-21

<150> 09/178,851

<151> 1998-10-26

<160> 10

<170> PatentIn version 3.1 .

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<211> 1254

<212> DNA

<213> Streptococcus equisimilis

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Sequence Listing created in PatentIn.ST25

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<212> PRT
<213> Streptococcus equisimilis

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Ser Leu Ser Ile Tyr Gly Phe Leu Leu Ile Ala Tyr Leu Leu Val Lys
          35           40           45

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Met Ser Leu Ser Phe Phe Tyr Lys Pro Phe Lys Gly Arg Ala Gly Gln
          50           55           60

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Tyr Lys Val Ala Ala Ile Ile Pro Ser Tyr Asn Glu Asp Ala Glu Ser
65           70           75           80

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Leu Leu Glu Thr Leu Lys Ser Val Gln Gln Gln Thr Tyr Pro Leu Ala
          85           90           95

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Glu Ile Tyr Val Val Asp Asp Gly Ser Ala Asp Glu Thr Gly Ile Lys
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Arg Ile Glu Asp Tyr Val Arg Asp Thr Gly Asp Leu Ser Ser Asn Val
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Ile Val His Arg Ser Glu Lys Asn Gln Gly Lys Arg His Ala Gln Ala
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Trp Ala Phe Glu Arg Ser Asp Ala Asp Val Phe Leu Thr Val Asp Ser
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Asp	Thr	Tyr	Ile	Tyr	Pro	Asp	Ala	Leu	Glu	Glu	Leu	Leu	Lys	Thr	Phe	165	170	175
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Arg	Gln	Thr	Asn	Leu	Leu	Thr	Arg	Leu	Thr	Asp	Ile	Arg	Tyr	Asp	Asn	195	200	205
Ala	Phe	Gly	Val	Glu	Arg	Ala	Ala	Gln	Ser	Val	Thr	Gly	Asn	Ile	Leu	210	215	220
Val	Cys	Ser	Gly	Pro	Leu	Ser	Val	Tyr	Arg	Arg	Glu	Val	Val	Val	Pro	225	230	235
Asn	Ile	Asp	Arg	Tyr	Ile	Asn	Gln	Thr	Phe	Leu	Gly	Ile	Pro	Val	Ser	245	250	255
Ile	Gly	Asp	Asp	Arg	Cys	Leu	Thr	Asn	Tyr	Ala	Thr	Asp	Leu	Gly	Lys	260	265	270
Thr	Val	Tyr	Gln	Ser	Thr	Ala	Lys	Cys	Ile	Thr	Asp	Val	Pro	Asp	Lys	275	280	285
Met	Ser	Thr	Tyr	Leu	Lys	Gln	Gln	Asn	Arg	Trp	Asn	Lys	Ser	Phe	Phe	290	295	300
Arg	Glu	Ser	Ile	Ile	Ser	Val	Lys	Lys	Ile	Met	Asn	Asn	Pro	Phe	Val	305	310	315
Ala	Leu	Trp	Thr	Ile	Leu	Glu	Val	Ser	Met	Phe	Met	Met	Leu	Val	Tyr	325	330	335
Ser	Val	Val	Asp	Phe	Phe	Val	Gly	Asn	Val	Arg	Glu	Phe	Asp	Trp	Leu	340	345	350
Arg	Val	Leu	Ala	Phe	Leu	Val	Ile	Ile	Phe	Ile	Val	Ala	Leu	Cys	Arg	355	360	365
Asn	Ile	His	Tyr	Met	Leu	Lys	His	Pro	Leu	Ser	Phe	Leu	Leu	Ser	Pro	370	375	380
Phe	Tyr	Gly	Val	Leu	His	Leu	Phe	Val	Leu	Gln	Pro	Leu	Lys	Leu	Tyr			

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385 390 395 400

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Leu

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<212> DNA
<213> Streptococcus equisimilis

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<211> 567
<212> PRT
<213> Chlorella virus PBCV-1

<400> 7

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Ser Asn Leu Ile Ala Val Gly Gly Ala Ser Leu Ile Leu Ala Pro Ala

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20

25

30

Ile Thr Gly Tyr Val Leu His Trp Asn Ile Ala Leu Ser Thr Ile Trp
35 40 45

Gly Val Ser Ala Tyr Gly Ile Phe Val Phe Gly Phe Phe Leu Ala Gln
50 55 60

Val Leu Phe Ser Glu Leu Asn Arg Lys Arg Leu Arg Lys Trp Ile Ser
65 70 75 80

Leu Arg Pro Lys Gly Trp Asn Asp Val Arg Leu Ala Val Ile Ile Ala
85 90 95

Gly Tyr Arg Glu Asp Pro Tyr Met Phe Gln Lys Cys Leu Glu Ser Val
100 105 110

Arg Asp Ser Asp Tyr Gly Asn Val Ala Arg Leu Ile Cys Val Ile Asp
115 120 125

Gly Asp Glu Asp Asp Asp Met Arg Met Ala Ala Val Tyr Lys Ala Ile
130 135 140

Tyr Asn Asp Asn Ile Lys Lys Pro Glu Phe Val Leu Cys Glu Ser Asp
145 150 155 160

Asp Lys Glu Gly Glu Arg Ile Asp Ser Asp Phe Ser Arg Asp Ile Cys
165 170 175

Val Leu Gln Pro His Arg Gly Lys Arg Glu Cys Leu Tyr Thr Gly Phe
180 185 190

Gln Leu Ala Lys Met Asp Pro Ser Val Asn Ala Val Val Leu Ile Asp
195 200 205

Ser Asp Thr Val Leu Glu Lys Asp Ala Ile Leu Glu Val Val Tyr Pro
210 215 220

Leu Ala Cys Asp Pro Glu Ile Gln Ala Val Ala Gly Glu Cys Lys Ile
225 230 235 240

Trp Asn Thr Asp Thr Leu Leu Ser Leu Leu Val Ala Trp Arg Tyr Tyr
245 250 255

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Ser	Ala	Phe	Cys	Val	Glu	Arg	Ser	Ala	Gln	Ser	Phe	Phe	Arg	Thr	Val	260	265	270
Gln	Cys	Val	Gly	Gly	Pro	Leu	Gly	Ala	Tyr	Lys	Asp	Ile	Ile	Lys	Glu	275	280	285
Ile	Lys	Asp	Pro	Trp	Ile	Ser	Gln	Arg	Phe	Leu	Gly	Gln	Lys	Cys	Thr	290	295	300
Tyr	Gly	Asp	Asp	Arg	Arg	Leu	Thr	Asn	Glu	Ile	Leu	Met	Arg	Gly	Lys	305	310	315
Lys	Val	Val	Phe	Thr	Pro	Phe	Ala	Val	Gly	Trp	Ser	Asp	Ser	Pro	Thr	325	330	335
Asn	Val	Phe	Arg	Tyr	Ile	Val	Gln	Gln	Thr	Arg	Trp	Ser	Lys	Ser	Trp	340	345	350
Cys	Arg	Glu	Ile	Trp	Tyr	Thr	Leu	Phe	Ala	Ala	Trp	Lys	His	Gly	Leu	355	360	365
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Gly	Asn	Glu	Lys	Pro	Ser	Val	Gly	Thr	Arg	Val	Ala	Leu	Trp	Ala	Lys	465	470	475
Gln	Tyr	Leu	Ile	Ala	Tyr	Met	Trp	Trp	Ala	Ala	Val	Val	Gly	Ala	Gly	485	490	495

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Val Tyr Ser Ile Val His Asn Trp Met Phe Asp Trp Asn Ser Leu Ser
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Tyr Arg Phe Ala Leu Val Gly Ile Cys Ser Tyr Ile Val Phe Ile Val
515 520 525

Ile Val Leu Val Val Tyr Phe Thr Gly Lys Ile Thr Thr Trp Asn Phe
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attaataaat taagtcagtt aaatctaaat tgtgaataca tcatttttga taatcatgac	2460
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caatttgcac ttttaatctt agaaaagaaa accggccatg tatttaataa aacatcgacc 2820
ctgacttata tgccttggga acgaaaatta caatggacaa atgaacaaat tgaaagtgca 2880
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<213> pasteurella multocida

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35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys
50 55 60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
65 70 75 80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu
85 90 95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
100 105 110

Val Arg Ala Val Ala Leu Val Pro Lys Asp Phe Pro Lys Asp Leu Val
115 120 125

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys
130 135 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu
145 150 155 160

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Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
165 170 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
180 185 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
195 200 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly
210 215 220

Phe Cln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr
225 230 235 240

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp
245 250 255

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp Asp Asp Leu Thr Ile
260 265 270

Ile Gly Pro Arg Lys Tyr Ile Asp Thr Gln His Ile Asp Pro Lys Asp
275 280 285

Phe Leu Asn Asn Ala Ser Leu Leu Glu Ser Leu Pro Glu Val Lys Thr
290 295 300

Asn Asn Ser Val Ala Ala Lys Gly Glu Gly Thr Val Ser Leu Asp Trp
305 310 315 320

Arg Leu Glu Gln Phe Glu Lys Thr Glu Asn Leu Arg Leu Ser Asp Ser
325 330 335

Pro Phe Arg Phe Phe Ala Ala Gly Asn Val Ala Phe Ala Lys Lys Trp
340 345 350

Leu Asn Lys Ser Gly Phe Phe Asp Glu Glu Phe Asn His Trp Gly Gly
355 360 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Arg Tyr Gly Ser Phe Phe
370 375 380

Lys Thr Ile Asp Gly Ile Met Ala Tyr His Gln Glu Pro Pro Gly Lys

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385		390		395		400
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Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu						
	420		425		430	
Asp Ser His Ile Asn Arg Val Pro Leu Val Ser Ile Tyr Ile Pro Ala						
	435		440		445	
Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn						
	450		455		460	
Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr						
	465		470		475	480
Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg						
	485		490		495	
Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn						
	500		505		510	
Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser						
	515		520		525	
Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe						
	530		535		540	
Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val						
	545		550		555	560
Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe						
	565		570		575	
Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met						
	580		585		590	
Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Lys Ile						
	595		600		605	
Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly						
	610		615		620	

Sequence Listing created in PatentIn.ST25

Lys	Phe	Lys	His	Leu	Asn	Lys	Ile	Cys	Tyr	Asn	Arg	Val	Leu	His	Gly	
625					630				635						640	
Asp	Asn	Thr	Ser	Ile	Lys	Lys	Leu	Gly	Ile	Gln	Lys	Lys	Asn	His	Phe	
				645					650					655		
Val	Val	Val	Asn	Gln	Ser	Leu	Asn	Arg	Gln	Gly	Ile	Thr	Tyr	Tyr	Asn	
			660					665					670			
Tyr	Asp	Glu	Phe	Asp	Asp	Leu	Asp	Glu	Ser	Arg	Lys	Tyr	Ile	Phe	Asn	
	675						680					685				
Lys	Thr	Ala	Glu	Tyr	Gln	Glu	Glu	Ile	Asp	Ile	Leu	Lys	Asp	Ile	Lys	
	690					695					700					
Ile	Ile	Gln	Asn	Lys	Asp	Ala	Lys	Ile	Ala	Val	Ser	Ile	Phe	Tyr	Pro	
705					710					715					720	
Asn	Thr	Leu	Asn	Gly	Leu	Val	Lys	Lys	Leu	Asn	Asn	Ile	Ile	Glu	Tyr	
				725					730					735		
Asn	Lys	Asn	Ile	Phe	Val	Ile	Val	Leu	His	Val	Asp	Lys	Asn	His	Leu	
			740					745					750			
Thr	Pro	Asp	Ile	Lys	Lys	Glu	Ile	Leu	Ala	Phe	Tyr	His	Lys	His	Gln	
	755					760						765				
Val	Asn	Ile	Leu	Leu	Asn	Asn	Asp	Ile	Ser	Tyr	Tyr	Thr	Ser	Asn	Arg	
	770					775					780					
Leu	Ile	Lys	Thr	Glu	Ala	His	Leu	Ser	Asn	Ile	Asn	Lys	Leu	Ser	Gln	
785					790					795					800	
Leu	Asn	Leu	Asn	Cys	Glu	Tyr	Ile	Ile	Phe	Asp	Asn	His	Asp	Ser	Leu	
				805					810					815		
Phe	Val	Lys	Asn	Asp	Ser	Tyr	Ala	Tyr	Met	Lys	Lys	Tyr	Asp	Val	Gly	
			820					825					830			
Met	Asn	Phe	Ser	Ala	Leu	Thr	His	Asp	Trp	Ile	Glu	Lys	Ile	Asn	Ala	
	835						840					845				
His	Pro	Pro	Phe	Lys	Lys	Leu	Ile	Lys	Thr	Tyr	Phe	Asn	Asp	Asn	Asp	
	850					855					860					

Sequence Listing created in PatentIn.ST25

Leu	Lys	Ser	Met	Asn	Val	Lys	Gly	Ala	Ser	Gln	Gly	Met	Phe	Met	Thr
865					870					875					880
Tyr	Ala	Leu	Ala	His	Glu	Leu	Leu	Thr	Ile	Ile	Lys	Glu	Val	Ile	Thr
				885					890					895	
Ser	Cys	Gln	Ser	Ile	Asp	Ser	Val	Pro	Glu	Tyr	Asn	Thr	Glu	Asp	Ile
			900					905					910		
Trp	Phe	Gln	Phe	Ala	Leu	Leu	Ile	Leu	Glu	Lys	Lys	Thr	Gly	His	Val
		915					920					925			
Phe	Asn	Lys	Thr	Ser	Thr	Leu	Thr	Tyr	Met	Pro	Trp	Glu	Arg	Lys	Leu
	930					935					940				
Gln	Trp	Thr	Asn	Glu	Gln	Ile	Glu	Ser	Ala	Lys	Arg	Gly	Glu	Asn	Ile
945					950					955					960
Pro	Val	Asn	Lys	Phe	Ile	Ile	Asn	Ser	Ile	Thr	Leu				
				965					970						